

Original Article



HIV-infected Female Sex Workers High Risk Behavior and Attitude Changes in Kaiyuan City, Yunnan Province, China *

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Abstract

Objective To investigate the attitude and sexual behavior status and change among HIV positive female workers in entertainment sites in Kaiyuan city, Yunnan province, China. The key information should be applied in the integrated intervention program in future.

Methods A cohort survey among HIV positive female workers was conducted during 12 months, between 2010 and 2012. All the risk sexual behavior and attitude were collected for assessment for the potential secondary transmission to sexual partners.

Results Of 99 HIV positive women who sell sex in Kaiyuan city, 99 participated in the survey at baseline, 80, 80, 75, and 75 at 3-, 6-, 9-, and 12-month follow-ups. The percentage of participants who reported consistently used condoms in the last one month ranged between 94.5% and 95.5%. The client volume in the last one month, income per sex and age group were significant related with non-insistent condom use with their clients.

Conclusion It was suggested that integrated intervention program package should include 100 percent condom use promotion for the HIV positive FSW with all sexual partners, and also, include socially support involved.

Key words: HIV-infected; Female sex workers; Sexual behavior; Change

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INTRODUCTION

Female sex workers (FSWs) are taking very important role in the HIV/AIDS epidemic spread world widely^[1]. During past two decades, many countries conducted numbers of

investigation and research on HIV infection or related high risk factors among FSWs population varied by regions, such as in Africa, America, Asia^[2-5]. In China, FSWs who infected with HIV were one kind of victims in commercial sexual activities^[6-7]. Moreover, HIV-infected FSW are the significant risk

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potential resource in the HIV transmission from FSWs and their clients to general population^[8]. However, limited information focused on the HIV-infected FSWs such as attitude and high-risk sexual behavior of post-infection and after notification is available. This information will be helpful for us to application the integrated intervention on the HIV transmission from FSW to general population.

Based on the Marks et al. review^[9], high-risk sexual behaviour prevalence was lower 53% among the persons of HIV⁺ aware than unaware of their status, including men and women in US. The high-risk sexually behaviour was self-reported unprotected anal or vaginal intercourse in related studies. Also, in US more than 50% of new infection men have unprotected anal intercourse with HIV-negative or unknown serostatus^[10]. After learning of their HIV infection, recent seroconverters did not reduce the risk of transmission in China for HIV partner notification. In a Chinese study^[11], a median of 16% of named partners were notified.

In this study, we assessed the potential for continued secondary HIV transmission by determining the prevalence of FSWs high-risk behavior after their notification status. FSWs high-risk behavior included self-reported unprotected sexually practice with their clients and regular partners; and drug user FSWs continued their drug abuse and needle sharing activities. The data would be application in the design of a multiple protection intervention package in FSWs secondary HIV transmission.

METHODS

Study Setting

Recent epidemic reports from China suggest that new HIV transmission is increasingly driven by sexual transmission, which show that 46.5% of all people living with HIV are thought to have contracted HIV. This national trend of this reflected in southern Yunnan province, where the early years of the HIV epidemic was dominated by injection drug use due to its proximity to the heroin producing Golden Triangle in Southeast Asia. In contrast to 1989 when all reported cases were attributed to injection drug use, by 2007, 47.4% were attributed by unprotected sex. Though estimates of HIV prevalence among Yunnan FSWs remain relatively low at 2.0%, alarmingly, high rates have been

reported among sub-groups across the province including street-based FSWs (18.2%) and drug-using FSWs (36.7%). Female sex workers therefore remain a priority target for prevention activities in Yunnan in light of their own vulnerability to infection and their potential role in HIV transmission to the ‘general population’ through sex with their male clients.

Kaiyuan city is located in Honghe, a largely rural prefecture located in central Yunnan province. Its proximity to a major trade and transit corridor between China and Southeast Asia has brought about rapid economic development to the area since the 1990’s, but along with it a vibrant heroin trafficking trade appeared as well. The result caused heroin use popular as well as the blossoming of a local commercial sex industry, both of which have had profound impacts on HIV/AIDS transmission. It is estimated that more than 1 000 FSWs are working in the downtown area of Kaiyuan, which has a population of roughly 300 000. Due to the prevalence of drug use and commercial sex related behaviors, the ‘twin epidemics’ in Kaiyuan led to it becoming one of the most severely impact cities in the country.

Study Population

A cohort study included HIV-infected FSWs who were identified in prior cross-sectional survey in China Comprehensive Integrated Programs for Research on AIDS (CIPRA CH 005) in Kaiyuan years ago. Important questions about the linkage between drug use and HIV-infection in FSWs were addressed through the cohort, such as: 1) Were drug-using HIV-infected FSWs more likely than those who were non-drug using to continue to practice commercial sex 1 year or more after learning their serostatus? 2) Did women who were drug users enter a drug treatment program? Our hypothesis related to Question 1 is that drug use will be the primary predictor of whether HIV-infected FSWs continue as commercial sex workers. In addition to these primary questions about drug use, we also collected data on other risk factors in order to control as confounding factors in our primary analyses. The additional information will allow us to explore secondary questions in the broader HIV-infected FSW population that may be useful for planning interventions, such as: 1) What were the factors associated with low rates of condom use seen in FSWs? 2) Did the rate of condom use in these women change over the course of a year?

For these special aims, it was important to learn

more about the behavior of FSWs who learn they were infected with HIV. Their behaviors with regard to sex work, drug use, their regular partners' drug use, and medical care and treatment were of particular interest. In cohort, we enrolled 99 HIV-infected FSWs identified during CIPRA CH 005 or from prior cohort investigation. Participants in the cohort were interviewed at baseline and in Months 3, 6, 9, and 12 of the cohort. Interviews would address the participants' sex work, drug use, regular partners' drug use, and medical care and treatment patterns. Drug use identified by self-report or urine opiate testing. FSWs self-reported that never use any drug including new type and urine opiated testing negative were considered as non-drug user.

All enrolled participants were invited to Kaiyuan Red Ribbon Garden (a non-government organization provides service for local FSW and IDU, including such as peer education, needle exchange, and condom free distribution since 2005 in Kaiyuan city). All trained interviewers were from Kaiyuan Center for Disease Control and Prevention (Kaiyuan CDC). The questionnaire was requested face-to-face by one interviewer to one participant in separated room. In the following visits, three parts of enrolled participants did not come to interview, including leaving for other place or hometown for some purposes, or in compulsory rehabilitation center because of drug use again, or no any update details of contact information in interview time. For some enrolled HIV-positive FSWs leaving for other place or hometown, interviewer managed to contact with her still using telephone for interview. For some enrolled HIV-positive FSWs in Kaiyuan compulsory rehabilitation center, interviewers had face-to-face interview in separated room in the center. The third parts of participants were missing in the cohort study.

Data Collection

All participants enrolled from communities, entertainment sites, or compulsory rehabilitation center in Kaiyuan city, Yunnan province, China. The participants were female sex workers currently or ever before survey in local site, were 16 years old or more, and now were HIV infected with Western blot (WB) test confirmed. Also, all participants agreed and signed informed consent forms which approved by institutional review board (IRB). All participants agreed to accept follow-up four interviews in the coming one year in Kaiyuan city. Each participant was assigned a personal identified (PID) number that

contained no personal identifiers. The PID was recorded on the Local Form, which is the only place where the PID can be associated with an individual's name and contact information. All other study forms and specimens were identified only by the PID.

To optimize retention, peer-outreach contacted the participant before each scheduled visit. For missed visits, the study staffs contacted the participants and reschedule the visits. When study staffs were unable to contact the participant directly, they contacted the participants' representative to obtain updated contact information. Four follow-up visits were carried out following IRB study approval. The three-month follow-up visit took place in March 2011, the six-month visit in June 2011, the nine-month visit in October 2011 and the twelve-month visit in January 2012. Retention rates for each of the follow-up visits varied range between 75% and 80%.

To maintain a high retention rate, methods used to contact FSW participants for follow-up visits included phone calls, house visits, and contacting participants' friends or brothel owners. Participants who attended follow-up visits were encouraged to return for their free physical examination, to receive test results and counseling, and to update their contact information. Also, we managed to contact with compulsory rehabilitation center in Kaiyuan city to find out some of participants because of urine morphine test positive and reenrolled in the center during follow-up period. HIV-positive participants were referred to Kaiyuan People's Hospital for treatment and the local CDC for disease monitoring. Anti-retroviral therapy (ART) was made available through the national ART project to participants who met the criteria. All ART will be done in Kaiyuan People's Hospital.

We interviewed participants to obtain information on social-demographics, health status, drug use, HIV and STI knowledge, and behavioral risk factors at baseline survey. The follow-up interviews focused on the participants' sex work, drug use, regular partners' drug use, and medical care and treatment patterns after their HIV infection status. Also, the commercial sex activities, use of condom with commercial and regular partners were included. Continuous practice of commercial sex work was asked of HIV-infected participants in cohort study at baseline, 3-, 6-, 9-, and 12-month visits. Participants were asked about the frequency of condom use with their regular partners and with clients. Condom use with regular partners and use with clients were

treated as two separated outcome variables. FSWs in sex venues were categorized into three groups (such as high, medium, and low level) based on average income, which generally corresponds to location of the entertainment venues and hotels in Kaiyuan city. Income of 50 RMB or less was defined as 'low level', 51-100 RMB was 'medium level', and more than 100 RMB per sex service was 'high level' in the baseline survey.

Statistical Analysis

Regarding the factors associated with low rates of condom use seen in FSWs, Kruskal Wallis Chi-square tests was used to identify variables with a univariate relation to the lowest ordinal level of condom use at any study visit. Candidate variables were age, education level, partner characteristics (regular partner vs. client), and entertainment level. The regression models were used to identify two classes of risk factors for low condom use: significant main effects or two-way interactions that were either significant or nearly significant. Generalized estimating equations (GEE) were used to estimate repeated measures of rates of condom use over the course of the year. Independent variables were socio-demographic and behavioral characteristics; these were time-dependent, i.e., changing from one visit to another. The binary, repeated measures dependent variable is condom use 'yes/no' at a visit. The model also includes a main effect of time (i.e., visit number) and time by covariate interactions. Statistical analysis was performed using SPSS 19.0 (IBM SPSS Inc, Chicago IL).

Quality Control and Ethical Issues

The protocol of this study was approved by the institutional review boards of the National Center for AIDS/STD Prevention and Control (NCAIDS), National Institute of Health (NIH) to assure the quality of the study and protection of participants' rights. All study team and staff in local CDC were trained before the field investigation and lab tests according to SOP established in the CIPRA.

RESULTS

Basic Characteristic of HIV-positive FSW

The mean age of 99 enrolled participants was 34.0 years old (SD, 6.5 years old). The marital status showed that 59.6% of the sample population was married or cohabiting; 21.2% of was divorced or

widowed; and 19.2% of was unmarried. In ethnics, 80.8% of was Chinese Han; 19.2% of was Hui or Yi etc. others. No schooling education part was 6.1%. 82.8% of was drug user FSWs; and 79.8% of participants was injecting drug user FSWs at baseline survey.

Risk Behavior and Attitude

The general commercial sexual practice has remained 45% to 59% high prevalence during 12 months after their aware HIV infection status. Regarding behaviors that affect HIV or STI transmission, the percentage of participants who self-reported consistently used condoms with clients in the last one month ranged between 94.5% and 95.5%. In addition, the percentage who said they consistently used condoms with their regular partners increased from 58.7% to 69.8% in the same period. Client volume also increased over the course of the study; the percentage of participants who had 10 or more clients in the last month rose from 17.5% to 28.0% by January 2012. Average per-client income also skewed toward both the upper and lower ends of the spectrum; while 75% of FSWs at the first follow-up said they earned between 51-100 RMB per client, that fell to 56% by the last follow-up, and the percentage who earned below 51 RMB or over 100 RMB increased 8% (from 16% to 24%) and 11% (from 9% to 20%) respectively. The value of repeat clients of HIV infected FSWs was reduced from 43% to 20% during 12 months after they aware their infection status (Table 1).

When asked about drug use behavior, at each of the four follow-up visits more than 80% of participants reported having ever used drugs. Among drug using FSWs, 88%-97% had ever injected drugs. Over all four visits between 35%-55% of drug users reported ever receiving methadone maintenance treatment (MMT) in the past 3 months. Of these, 30%-83% reported adhering to treatment after starting MMT. Among HIV-positive participants over the four visits, 57%-67% participants had had a CD4+ cell tests in the past three months and 5%-17% had had viral load testing. Date showed that ART treatment rates were only 20%-30% (Table 1).

GEE analysis on the non-insistent condom use with clients showed client volume in last one month, income per sex, and age group were related significant factors. The data indicated that a large client volume, lower lever income per sex and younger FSWs were contributed to refuse condom use in commercial sex activities (Table 2).

Table 1. Character and High Risk Behavior at Baseline and Follow up in Kaiyuan City

Variable	Baseline N=99	Follow-up 1 N=80	Follow-up 2 N=80	Follow-up 3 N=75	Follow-up 4 N=75	χ^2 or t Value	P Value
	n (%)	n (%)	n (%)	n (%)	n (%)		
Mean age \pm s (years old)	34.0 \pm 6.5	34.5 \pm 6.5	34.3 \pm 6.4	34.8 \pm 6.5	35.2 \pm 6.7	0.383	0.821
Marital status							
Unmarried	19 (19.2)	13 (16.3)	20 (25.0)	13 (17.3)	12 (16.0)	3.561	0.469
Married or cohabitating	59 (59.6)	51 (63.8)	49 (61.3)	54 (72.0)	53 (70.7)		
Divorced or widowed	21 (21.2)	16 (20.0)	11 (13.8)	8 (10.7)	10 (13.3)		
Ethnics							
Others	19 (19.2)	16 (20.0)	16 (20.0)	17 (22.7)	16 (21.3)	0.375	0.984
Chinese Han	80 (80.8)	64 (80.0)	64 (80.0)	58 (77.3)	59 (78.7)		
School education							
No	6 (6.1)	6 (7.5)	6 (7.5)	6 (8.0)	6 (8.0)	0.340	0.987
Yes	93 (93.9)	74 (92.5)	74 (92.5)	69 (92.0)	69 (92.0)		
Number of clients in last month							
0 clients	2 (2.0)	44 (55.0)	41 (51.3)	31 (41.3)	35 (46.7)	52.28	<0.0001*
1-10 clients	62 (62.6)	22 (27.5)	25 (31.3)	25 (33.3)	19 (25.3)		
More than 10 clients	35 (35.4)	14 (17.5)	14 (17.5)	19 (25.3)	21 (28.0)		
Consistent condom use with clients in last month							
Yes	94 (96.9)	34 (94.4)	37 (94.9)	42 (95.5)	38 (95.0)	0.599	0.963
No	3 (3.1)	2 (5.6)	2 (5.1)	2 (4.5)	2 (5.0)		
Average income per commercial sexual service							
50 RMB or less	30 (30.3)	13 (16.3)	21 (26.3)	10 (13.3)	18 (24.0)	9.58	0.048*
51-100 RMB	45 (45.5)	60 (75.0)	46 (57.5)	50 (66.7)	42 (56.0)		
More than 100 RMB	24 (24.2)	7 (8.8)	13 (16.3)	15 (20.0)	15 (20.0)		
Ever had a repeat client in past 3 months							
Yes	43 (43.4)	25 (31.3)	23 (28.8)	22 (29.3)	15 (20.0)	11.58	0.021*
No	56 (56.6)	55 (68.8)	57 (71.3)	53 (70.7)	60 (80.0)		
Consistent condom use with repeat clients							
Yes	41 (95.3)	21 (84.0)	22 (95.7)	20 (90.9)	13 (86.7)	3.53	0.473
No	2 (4.7)	4 (16.0)	1 (4.3)	2 (9.1)	2 (13.3)		
Have ever used drugs							
Yes	82 (82.8)	68 (85.0)	66 (82.5)	61 (81.3)	61 (81.3)	0.491	0.974
No	17 (17.2)	12 (15.0)	14 (17.5)	14 (18.7)	14 (18.7)		
Drug use initiated after knowledge of HIV status							
Yes	3 (3.7)	4 (5.9)	5 (7.6)	1 (1.6)	2 (3.3)	3.294	0.510
No	79 (96.3)	64 (94.1)	61 (92.4)	60 (98.4)	59 (96.7)		
Ever injected drugs							
Yes	76 (92.7)	60 (88.2)	63 (95.5)	59 (96.7)	59 (96.7)	5.869	0.209
No	6 (7.3)	8 (11.8)	3 (4.5)	2 (3.3)	2 (3.3)		
Ever received methadone maintenance treatment							
Yes	40 (48.8)	31 (45.6)	23 (34.8)	34 (55.7)	24 (39.3)	6.842	0.145
No	42 (51.2)	37 (54.4)	43 (65.2)	27 44.3)	37 (60.7)		
Adhere to methadone maintenance treatment after starting							
Yes	16 (41.0)	13 (41.9)	7 (30.4)	18 (52.9)	20 (83.3)	16.509	0.002*
No	23 (59.0)	18 (58.1)	16 (69.6)	16 (47.1)	4 (16.7)		
Ever had a CD4+ test							
Yes	64 (64.6)	54 (67.5)	54 (67.5)	51 (68.0)	43 (57.3)	2.674	0.614
No	35 (35.4)	26 (32.5)	26 (32.5)	24 (32.0)	32 (42.7)		
ART treatment							
Yes	25 (25.3)	19 (23.8)	21 (26.3)	23 (30.7)	15 (20.0)	2.396	0.663
No	74 (74.7)	61 (76.3)	59 (73.8)	52 (69.3)	60 (80.0)		

Note. * P value is less than 0.05.

When addressing the attitudes of HIV-positive FSW who knew their current HIV/AIDS infection status, 45%-70% had accepted their situation and 12%-17% felt they had become apathetic. Among participants 53%-68% had told someone of their HIV status, of whom 74%-88% had told their family members and 8%-43% had told their regular partners. None of the participants had told their clients or boss about their HIV status.

Drug Using and Non-drug Using Sexual Behavior

Among the non-drug user FSWs, the prevalence of commercial sexual practice remained 92%-100% during 12 months. Among the drug user FSWs, the prevalence of commercial sexual practice remained 25%-30% during the following 12 months. In comparing sexual behavior and condom use between drug-using and non-using HIV-positive FSWs, the percentage in the drug user group who averaged more than 10 clients per month increased from 12% to 21% over the four visits. However, in the non-drug using HIV-positive FSWs group between 29%-57% averaged more than 10 clients per month in the same time period. Percentages of

participants who reported consistently using condoms with regular partners were also similar 56%-69% in the drug user group and 56%-78% in the non-user group (Table 3).

STI and Clinical Service

In the baseline survey, the prevalences of Syphilis, Herpes simplex virus type 2 (HSV-2) and HCV infection were 15.2% (15/99), 90.9% (90/99), and 78.8% (78/99) separately among 99 HIV-positive FSWs in Kaiyuan. During one year follow ups, there 11% participants (53 person time) reported any symptom during baseline and follow-ups (Table 4), including abdominal pain (30 person time), abnormal vaginal discharge (28 person time), vaginal bleeding between periods (3 person time), painful intercourse (3 person time), pain or burning sensation while urinating (2 person time), serious or persistent pelvic pain (2 person time), and genital warts (2 person time). Among these people, 28.13% (9/32) had been to public hospital clinic for the health services. 3.13% (1/32) had been to private clinical. 59.38% (19/32) had been to pharmacy for medicine by themselves during one year visits (Table 5).

Table 2. GEE Model Factors on Non-insistent Condom Use with Their Clients

Variable	B	sx	95% Wald Confidence Interval		Hypothesis Test		
			lower	upper	Wald χ^2	Df	P Value
client one month=less 10 clients	-0.523	0.229	-0.973	-0.074	5.201	1	0.023*
income per sex=more than 50 yuan	-0.360	0.160	-0.675	-0.046	5.043	1	0.025*
age group=less than 35 years old	-0.548	0.223	-0.985	-0.110	6.021	1	0.014*

Note. * P value is less than 0.05.

Table 3. Comparisons in Behavior and Condom Using of HIV+ FSWs with Drug User or Non-drug User

Variable		Baseline	Follow-up 1	Follow-up 2	Follow-up 3	Follow-up 4	χ^2	P Value
		N=99	N=80	N=80	N=75	N=75		
		n (%)	n (%)	n (%)	n (%)	n (%)		
Number of clients in the last month								
Drug user	0	2 (2.4)	43 (63.2)	40 (60.6)	31 (50.8)	34 (55.7)	61.44	<0.0001 [*]
	1-10	54 (65.9)	17 (25.0)	16 (24.2)	17 (27.9)	14 (23.0)		
	More than 10	26 (31.7)	8 (11.8)	10 (15.2)	13 (21.3)	13 (21.3)		
Non-drug user	0	0 (0.0)	1 (8.3)	1 (7.1)	0 (0.0)	1 (7.1)	2.732	0.604
	1-10	8 (47.1)	5 (41.7)	9 (64.3)	8 (57.1)	5 (35.7)		
	More than 10	9 (52.9)	6 (50.0)	4 (28.6)	6 (42.9)	8 (57.1)		
Consistent condom use with regular partner								
Drug user	Yes	34 (64.2)	22 (56.4)	25 (59.5)	28 (65.1)	31 (68.9)	1.720	0.787
	No	19 (35.8)	17 (43.6)	17 (40.5)	15 (34.9)	14 (31.1)		
Non-drug user	Yes	5 (71.4)	5 (71.4)	5 (55.6)	7 (77.8)	6 (75.0)	1.231	0.873
	No	2 (28.6)	2 (28.6)	4 (44.4)	2 (22.2)	2 (25.0)		

Note. * P value is less than 0.01.

DISCUSSION

Our study focused on the cohort study of HIV infected FSWs in high epidemic of HIV in Yunnan province, China. We made efforts on maintain cohort study during one year. About 75% or above participants joined the study during one year follow up visits. The characteristics of HIV-infected FSW in this region were high proportion of drug users (83%), low and medium level income per sex (76%), and low proportion of ART (25%-30%). The descriptions on the behavior status and changes after their knowledge of HIV infected status have public health signification on the AIDS transmission. Most of HIV-infected FSW (85%) reported to accept the status of HIV as realities or apathetic in the fourth follow up visits.

As compared to results before from the same cohort in Kaiyuan^[12-13], drug use, lower income from sex work, and being a local resident (as compared to those of outside of Yunnan) were all predictive factors for HIV infection. Compared to their infected counterparts, most HIV uninfected FSWs worked at a low risk entertainment such as salons or karaoke halls where they made on average over 100 RMB (about 17 US dollars) per sex service.

Among a few of FSWs (13%) with any symptom of related STI, 60% of those people choice pharmacy and 28% of choice public hospital clinic. The integrated intervention prevention should be taken on these special groups including reducing harms of drug using and improving ART coverage. Although in

the field, the processes of transferring to hospital for free ART and MMT program were in study, only a few of them accepted the services. There was a big gap and challenge in this field. The survey in local before^[14], FSWs were population with high risk STI such as *Chlamydia Trachomatis* and *Neisseria Gonorrhoeae*. The acceptable comprehensive medical service package including STIs and HIV should be significant for the stopping of the HIV transmission to others.

Many studies suggested that condom was considered one of the most effective prevention measures among female sex workers with HIV infection and STI^[15-16]. Condom promotion is acceptable policy in many countries^[17-18]. In our study, self-reported insistent condom use with clients last one month reached 84% to 95% in the follow-up visits. In this research, the main risk factors related non-insistent condom use with clients were low education level, a large volume of clients, low income per sex service, low level working place, etc. Obviously, those FSWs were the most vulnerable population in community. Although a long term research and prevention activities were conducted among the population in this area, the less education and low income people were still the most important difficult group. The effective and fit able social support should be involved in the intervention measures in future.

On injecting drug behaviour, 80% of the HIV infected FSWs also were drug users in this study. Our hypothesis was that drug using FSWs were more likely to have commercial sex in practice when they

Table 4. Have any Symptoms Related STIs during Follow-ups

Variables	Baseline N=99	Follow-up 1 N=80	Follow-up 2 N=80	Follow-up 3 N=75	Follow-up 4 N=75	χ^2	P Value
	n (%)	n (%)	n (%)	n (%)	n (%)		
Have symptoms past 3 months	14 (14.1)	8 (10.0)	10 (12.50)	10 (13.3)	11 (14.7)	0.96	0.916
No any symptoms at all	85 (85.9)	72 (90.0)	70 (87.5)	65 (86.7)	64 (85.3)		

Table 5. Medical Service Searching on Selected Symptoms during Follow-ups

Service or Treatment	Abnormal Vaginal Discharge (n=28)	Pain or Burning while Urinating (n=2)	Genital Warts (n=2)	Subtotal (n=32)	Prevalence (%)
pharmacy	16	2	1	19	59.38
public hospital	9	-	-	9	28.13
private clinic	1	-	-	1	3.13
left medicine before	1	-	-	1	3.13
no any treatment	1	-	1	2	6.25

were in community. Some of drug using FSWs were arrested in the compulsory detoxification because of urine morphine testing positive in the routing social security and management practice. In Kaiyuan city, the compulsory detoxification was organized by police office. The time of once stay in generally was two years. So, we compared with behavior status of FSWs of non-drug users and drug users in the community. There was no evidence to prove the drug using FSWs were more likely commercial sex practice than non-drug using FSW. As compared to results of previous survey to the same population^[19-20], the injecting drug use FSWs faced high risk for HIV and STI infection, and to continue drug use even after HIV diagnosis.

Most of FSWs understood their HIV infected status. However, because some of sex workers mainly live on sex work in daily life, they always kept on continue the commercial sex work while personality or environment permitted. The data showed nobody told their clients, boss or mommy about their HIV infected status. All commercial sex behaviour conducted without clients notification. Although, the condom use rate were higher than before, there were still no use the condom with clients, especially with familiar clients in practice. This is rather important issue for the management of HIV-positive FSWs. As compared to results of previous survey to the same population^[21], the HIV positive FSWs did not like to tell others their infection status, even the regular partner.

Comparing to past cross-sectional surveys in Kaiyuan city, the mean of commercial sex practice and non-commercial sex was similar to this survey during the one year. The results showed no significant behaviour changes when their understanding of HIV infected or not. Some of female sex workers were sadness or low in mood when first understanding their HIV infected, but generally in very short time they became 'normal' as used to. 45%-70% of HIV positive FSWs accepted their situation shortly. The condom use rates were still very low in the sex with their regular partners, although some of FSWs told them familiar with their HIV infected status. The main reasons of no condom use were regular partner dislike or female sex workers dislike. A few of those families had willingness of birth child in further.

The main limitation and bias in this investigation were obvious. First, limitation was low rates of follow-up visit. 20%-25% participants lost during the four visits. Although the peer outreaches did their

efforts to find out some information, some of them change their cell phone number or leave out of Kaiyuan. We had no idea if they continued sexual work in other place, or married with somebody in hometown. It may be under estimated the risk of the group. Second, because of long term intervention and activities by staff, the participants would potential reported high condom use rate (95%) with their clients. We had no other further evidence to prove the self-reported information correct or not. However, the 15% syphilis prevalence among 97% insistent condom use with their clients was difficult to explain. Also, according to the surveys during the follow-ups, 13% reported their symptom of STI in the one year. We did not identify if it related with their clients or regular partners. Further studies about their regular partners will be involved in our future study. Third, some of interviews were done in compulsory detoxification. Although all interviewers were from local CDC in separated room, there was still some potential bias objectively.

In conclusion, although the volume of repeat clients in last one month was declined, the insistent condom use with repeat clients and regular partner were still low. And, the evidence showed that the self-reported insistent condom use with clients was not high. The HIV infected FSWs were rather potential secondary transmission to their sexual partners. It was suggested that integrated intervention program package should include 100 percent condom use promotion, increasing CD4+ T cell test, HIV viral load test and early antiretroviral therapy for the HIV positive FSWs, and also, include socially support involved in order to decrease HIV transmission.

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